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Approved for public release; distrubition unlimited.

13. SUPPLEMENTARY NOTES

14. ABSTRACT

Most of the Equipments requested through this grant offer have been delivered. It has indeed had a profound positive effect on the teaching learning process within the department, the school and the community as a whole.

Students are now able to practically verify a theoretical concept of learning through the usage of this new equipments and gain valuable hands on replication of what the real concept looks like thereby given them a sense of understanding that can take them to a higher level of understanding and content retention.

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FINAL REPORT

The equipment acquired is now been used as a second laboratory called the Digital Laboratory. These equipments are capable of interfacing and communicating with other equipments. This Digital Laboratory is now been used for more advanced courses in the Electrical and Telecommunication technology majors. It enabled the instructors to demonstrate the latest technological aspects of troubleshooting using state of the art equipments. Also the students will have the chance to use modern equipment and perform technological challenging laboratory exercises.

The newly acquired equipments will be presented in two main sections:

I ELECTRICAL ELECTRONICS AND TELECOMMUNICATION TEACHING LABORATORY

As of the day of preparing the final report the following instruments have been delivered and set up for educational and research usage purposes.

- 6 Digital Oscilloscopes

  (HP 54815A Infinium Oscilloscopes with the following features: 500 MHz bandwidth; 4 channels; 1 Gsa/s sample rate; simple, analog-loke front panel; Windows 95-based graphical user interface; built-in information system; LAN printing and file sharing).

- 6 Power Supplies

  (HP E3631A Triple Output dc Power Supply with the following features: 3 dc outputs with 80-W total power; programmable, with HB-IP and RS-232 standard; clean stable output signals; linear regulation).

- 6 Function Generators

  (HP 33120A Function/Arbitrary Waveform Generator with the following features: 10 standard waveforms, with sign and square to 15 MHz; build arbitrary waveforms with 40-Msa/s speed and storage for 416,00-point waveforms).

The newly acquired instruments will enable the department of Physics and Technology to combine all analog equipment making one fully operational laboratory while the new equipment is been used for a second, state of the art digital laboratory. This allows the instructors to demonstrate new technology modality in reference to the old technology; observing this distinctive modality has greatly help our students, it allow them to gain experience with old and new technology equipments. It will help their survival and ensure success in any environment they may find themselves once they graduate from BCC.

The new instrumentation will significantly enhance the ability of engineering instructors to describe and demonstrate technology issues. It will enable students to tap the full potential of the digital learning and give them a better understanding of the pedagogy. More insight to the tools used for measurement and calibration on the field. Students will be better prepared to assume their role in the society and become successful in their careers part.

II Fiber Optic and Laser Communication Teaching Laboratory

The fiber optics laboratory at BCC has significant needs. The laboratory exercises that accompany the class work are now been performed on the new equipment. Due to this new equipment every student can now gain hands on experience. The equipment has greatly improved the student's ability to carry out the various laboratory exercises that is usually being done on demonstration basis. The equipment has upgraded the fiber optics laboratory with four complete kits of projects in fiber optics.

- 4 Six function work and Repair Center

  (WRS5000 Six-function Rework and Repair Center, a self-contained system complete with high powered 54 watt soldering iron, 60 watt inline de-soldering pencil, 100 watt hot air pencil, SMD tweezers, a vacuum pick-up pen, and a dispenser for solder paste or adhesive dispensing).

- 4 Handheld scopes

  (HP E8652A graphical multimeter with the following features: 100 MHz scope, meter, and recorder; large, bright, cold-cathode fluorescent display; cursor measurements and waveform math).

- 1 Fume extractor with accessories for three stations

  (WFE20 fume extractor; a filtration unit that reduces harmful soldering emissions by extracting 99.99 percent of fumes).

The areas of student's activities that have immediate positive effect of these changes are:

- Handling Fibers; Numerical Apertures
- Fiber Attenuation
- Single-Mode Fibers I
- Single-Mode Fibers II
- Coupling Fibers to Semiconductor Sources
- Connectors and Splices
- Components for Fiber Communications
- Fiber Optic Communication Link

- Multimode Intensity Sensors
- Single-Mode Inter-ferometric Sensors

Advantages of fully Operational Teaching Laboratory

The instructors are able to assign more challenging projects to their students. Students now have the means to design and implement challenging projects such as circuits for data collection, computer boards for specific functions, and other complicated projects.

The students are now getting the chance to familiarize themselves with the latest equipment in the technical field. This aspect is of great importance since major companies employ many of our graduates upon graduation as technicians where such equipment is readily available.